PROCEEDINGS

OF THE

CALIFORNIA ACADEMY OF SCIENCES

FOURTH SERIES

VOL. XIII, No. 22, pp. 341-372. NOVEMBER 29, 1924

XXII

BEES OF THE GENUS OSMIA IN THE COLLECTION OF THE CALIFORNIA ACADEMY OF SCIENCES

BY

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The Osmias in the collection of the California Academy of Sciences are chiefly from the Pacific Coast region and are the result of years of extensive collecting,—in most cases that of Mr. E. P. Van Duzee and Dr. E. C. Van Dyke. Before the study of this collection was undertaken, about 25 species of Osmia were known from this region. In the present lot are about 700 specimens, representing 64 species; of these 44 were species already known, leaving 20 new species. It has not been possible to do any matching of sexes from this region; so that the ultimate number of species must necessarily be reduced, probably to almost one-half of the present number. Twenty-seven of the species here recorded are known also from the Rocky Mountain region. At first this appears quite strange, but we find some of the species occurring in Utah and Idaho, and many in British Columbia; and when one considers the floras of these regions, this similarity of bee-faunas is not so strange.

In the Osmias of the Pacific Coast region one notes a predominance of dark pubescence, especially among the females, a striking contrast to the almost entirely pale pubescence of the Osmias of the eastern States. The Rocky Mountain

Osmias are more intermediate forms; and it is usually the case that the darker species are the ones found to extend to the Pacific Coast region. One notes, moreover, the comparatively large number of species in the west as compared with the number in the east.

The writer has attempted to give keys to the species of the Pacific Coast region, and trusts they may be found useful in separating the species occurring there. The names followed by an asterisk are of those species known to me only from the descriptions. *O. californica* Cresson was omitted from the key as undoubtedly it must be a race of *O. lignaria* Say. In Professor Cockerell's collection the specimen named *californica* by Cresson and Titus has proved to be *O. wilmattæ* Cockerell; but Cresson's description of *californica* seems to be applicable to specimens of *lignaria* and cannot possibly be applied to *wilmattæ*.

The writer has examined the male genitalia of each species, and has found them to be distinctive. With a little practice the genitalia may be extracted without damaging the specimen, and they seem to be constant for the species. This has proved to be a useful check in the determination of species; and apparently will be of value in the formation of groups within the genus, which is quite necessary in a genus as large as Osmia. Some of the most striking cases are the following: the genitalia of the Acanthosmioides are similar within the groups, and quite different from those of the other groups; *universitatis* Cockerell and *vandykei* Sandhouse, show a relationship; as do also *kenoyeri* Cockerell and *paradisica* Sandhouse. In such cases the correlation of characters of the genitalia with external characters, such as modified middle tarsi, crenulate flagella, etc., is very clear; in some other cases the external characters are not so distinctive, and further study is needed before groups may be defined. The writer has extracted the genitalia from practically all the North American species, and hopes to be able to give figures and discussions of them in a later publication.

To Dr. Barton Warren Evermann and Mr. E. P. Van Duzee, the writer is greatly indebted for the opportunity of studying this material; and to Professor Cockerell of the University of Colorado, for the use of his collections which contain most

of his type specimens of Osmia—and his literature with many manuscript notes, as well as for helpful criticisms and suggestions.

1. **Osmia vanduzeei** Sandhouse, new species

Male: About 15 mm. long; deep bluish grey-green; pubescence pale, except for some black hairs on dorsal segments 3-7 of the abdomen. Head ordinary; facial quadrangle a little longer than broad; inner orbits practically parallel; entire face clothed with a very dense pile of silky hairs so that the sculpturing is entirely concealed; the antennæ reach almost to the posterior margin of the mesothorax, scape black, flagellum strongly crenulate, dark ferruginous but paler beneath; anterior margin of clypeus shining black, truncate, fringed with white hairs; mandibles black, the bases obscurely greenish, apical tooth long. Thorax very closely and finely punctured; pubescence abundant; scutellum with a median polished line; disk of propodeum glaucous green, finely roughened; tegulæ black, punctured, anterior portion greenish, with tufts of pale hair. Abdomen shining; bases of segments with indistinct punctures, punctureless apical margins broad; sixth dorsal segment entire, weakly sinuate at the sides; seventh broadly notched; second ventral segment with a broad lamelliform process which is acutely uncinnate; third with a narrow emargination fringed with pale hairs; fifth weakly emarginate, with short yellowish hairs. Wings hyaline; anterior wing 9 mm. long; basal nervure just before nervulus; second cubital cell little longer than first on marginal; receiving first r. n. about ⅓ from base, and the second r. n. about 1/5 from apex. Legs metallic; tibial spurs curved at apex; hair on inner side of tarsi yellowish; apical tarsi dark ferruginous.

Type: Male, No. 1548, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, May 20, 1919, on **San Miguel Island, California.** *Paratype:* Keen Camp, Riverside Co., California, June 6-12, 1917 (E. P. Van Duzee).

2. **Osmia paradisica** Sandhouse, new species

Male: About 10-11 mm. long; nile green; except the face which is blue-green; pubescence pale, long and abundant on head and thorax. Facial quadrangle distinctly longer than wide, inner orbits practically parallel; anterior margin of clypeus truncate, fringed with white hairs; antennæ long, reaching the scutellum, flagellum very dark brown, dark ferruginous beneath; mandibles black, the apical tooth long. Mesothorax and scutellum shining between dense punctures; scutellum with a median polished streak; disk of propodeum dull blue-green; tegulæ dark brown,

faintly metallic and punctured anteriorly. Abdomen shining; the bases of the segments with indistinct punctures; punctureless apical margins of segments polished, reddish brown; sixth dorsal segment entire; seventh notched; third ventral segment emarginate, fringed with short yellow hairs; second a little produced in the middle. Wings hyaline; basal nervure just behind nervulus; second cubital cell longer than first on marginal, receiving first r. n. more than ¼ from base, and the second r. n. about 1/5 from apex. Legs black; joints 2-5 of tarsi reddish; middle tarsi little modified; hind spurs long and curved; hind basitarsus much less modified than that of *kenoyeri* Ckll., but similarly flattened; hair on inner sides of tarsi fulvous.

Type: Male, No. 1549, Mus. Calif. Acad. Sci., collected by E. C. Van Dyke, July 19, 1920, at **Paradise Valley, Mount Rainier, Washington.**

3. **Osmia vandykei** Sandhouse, new species

Male: About 10 mm. long; dark blue, the face lighter and brighter blue. Eyes large, giving the head a broad appearance; inner orbits converging slightly below; face closely punctured, a polished streak extending down from the middle ocellus; anterior margin of clypeus black, truncate, fringed with pale hair; mandibles black, bidentate, the teeth subequal; antennæ about as long as the thorax; scape black, flagellum dark brown and flattened anterio-posteriorly, in front the lower half is dark testaceous; apical joint of flagellum broad and curved downwards to form an angle of almost 90 degrees; hair of face white, of cheeks black. Hair of dorsum of thorax largely denuded, but apparently all white; hair of pleura pale in front, of the posterior half and the sides of propodeum black; mesothorax and scutellum with close, rather coarse punctures; scutellum with a polished median streak; disk of propodeum dull blue, finely roughened; tegulæ brown, anterior portion blue and punctate. Dorsal abdominal segments largely denuded of hair, but that on the first segment and the base of the second apparently pale, that on the remaining segments black; abdomen shining, the only punctures piliferous; punctureless apical margins of segments obscurely reddish; margins of segments 1-4 narrow, of segments 5-6 almost half as wide as the segment; sixth dorsal segment entire, somewhat truncated; seventh broad, entire; median base of sixth segment, and the seventh with long black bristles; third ventral segment deeply notched, fringed with short, pale yellow hairs; first with a small notch. Wings hyaline; second cubital cell strongly contracted above, hardly longer than first on marginal, receiving first r. n. ⅓ from base, and the second r. n. ¼ from apex. Legs black, with black pubescence; the posterior femora and tibiæ obscurely metallic; joints 2-3 of middle tarsi thickened; hind tibial spurs broad, almost falcate.

Type: Male, No. 1550, Mus. Calif. Acad. Sci., collected by E. C. Van Dyke, June 18, 1922, at **Fremont National Forest, Klamath Co., Oregon.** *Paratype:* one male, same data.

4. **Osmia bakeri** Sandhouse, new species

Male: About 9-10 mm. long; blue-green; pubescence white. Head ordinary; inner orbits practically parallel; flagellum dark brown, dark ferruginous beneath; clypeus blue, with dense long hairs; anterior margin truncate; face densely punctured. Mesothorax and scutellum closely punctured; propodeum a darker blue-green than the thorax; tegulæ brown, the anterior portion metallic and punctate. Wings faintly dusky; basal nervure meeting the nervulus; second cubital cell little longer than the first on marginal, receiving the first r. n. ⅓ from base, and the second r. n. 1/5 from apex. Abdomen very closely punctured; punctureless apical margins of segments narrow on segments 1-3, wider on segments 4-6; sixth dorsal segment entire; seventh with a broad and shallow emargination; third ventral segment with a shallow emargination, fringed with yellow hairs. Legs black, obscurely metallic; inner side of tarsi with tawny hairs.

Easily distinguished from all species known to the writer by the peculiar seventh dorsal segment of the abdomen.

Type: Male, in collection of T. D. A. Cockerell, collected by C. F. Baker at **Claremont, California.** *Paratypes:* two males, same data; two males, Keen Camp, California, June 6-12, 1917 (E. P. Van Duzee).

5. **Osmia nemoris** Sandhouse, new species

Male: About 9 mm. long; bluish grey-green, usually with brassy tints; pubescence entirely pale, faintly yellowish to tawny. Head and thorax very closely punctured; head as wide as thorax; facial quadrangle subquadrate; inner orbits practically parallel; eyes large; flagellum black, obscurely ferruginous beneath; anterior margin of clypeus truncate, black; mandibles black, the apical tooth longer. Scutellum with a median polished streak; tegulæ black, greenish in front. Wings faintly dusky; basal nervure just behind nervulus; second cubital cell about one and one-half times as long as first on marginal, receiving the first r. n. ¼ from base, and the second r. n. less than 1/5 from apex. Abdominal segments with wide punctureless apical margins; bases of segments with quite close punctures; sixth dorsal segment subsinuate at the sides, produced in the middle, the extreme apex truncate; seventh rather broad,

deeply notched, the two teeth very broad at apex; third ventral segment entire. Legs color of body; hind tibial spur straight; hind basitarsi toothed; apical tarsi dark ferruginous.

This species is superficially quite like *O. rustica* Cresson, with which it is sometimes confused, but it may be distinguished by the following characters: *O. rustica* has the sixth dorsal segment of the abdomen notched and not so produced in the middle; third ventral segment deeply emarginate; hind basitarsi not toothed; basal nervure before nervulus.

Type: Male, No. 1551, Mus. Calif. Acad. Sci., collected by E. C. Van Dyke, May 9, 1920, in **Muir Woods, Marin Co., California.** *Paratypes:* California: one male, Bryson, Monterey Co., May 18, 1920 (E. P. Van Duzee); one male, Pleyto, Monterey Co., May 22, 1920 (E. P. Van Duzee); two males, Claremont; one male, Palo Alto, April 6, 1892; one male, Mountain View, June. Washington: eight males, Olympia. Oregon: three males, Corvallis, June 10, 1892. Nevada: one male, Ormsby Co., July (C. F. Baker); British Columbia: one male, Vaseux Lake, June 14, 1919 (E. R. Buckell); one male, Fairview, May 18, 1919 (E. R. Buckell).

The paratypes are represented by specimens in the collections of the United States National Museum, Philadelphia Academy of Sciences, and Canadian Department of Agriculture.

6. **Osmia solitaria** Sandhouse, new species

Male: 10-11 mm. long; deep indigo blue; hair of head and thorax largely pale, of abdomen largely black. Head ordinary; hair of face and occiput pale, of cheeks pale, with a few black hairs intermixed, of vertex black; flagellum black; anterior margin of clypeus black, truncate, fringed with pale yellowish hairs; mandibles black, bidentate. Mesothorax very densely punctured; scutellum more coarsely and sparsely punctured; hair of dorsum of thorax white with a few black hairs intermixed; hair of pleura and sides of propodeum white; tegulæ black, anterior portion blue, punctate. Wings dusky hyaline; upper half of marginal cell fuliginous; basal nervure just behind nervulus; second cubital cell almost twice as long as first on marginal, receiving first r. n. about ¼ from base, and the second r. n. about 1/5 from apex. Abdomen robust, with indistinct punctures; punctureless apical margins of segments rather broad, purplish; first dorsal segment clothed with white hairs; on the bases of

segments 2-6 the hair is black, with inconspicuous submarginal bands of pale hair; sixth dorsal segment entire; seventh notched; third ventral segment with a broad emargination, fringed with yellow hairs. Legs dark blue; hind basitarsi not toothed; pubescence black and white intermixed; the black hairs longer and more sparse than the white.

Type: Male, No. 1552, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, June 6-12, 1917, at **Keen Camp, Riverside Co., California.**

7. **Osmia enixa** Sandhouse, new species

Male: About 9-10 mm. long; robust blue-green species; hair of head and thorax abundant, pale except for a few black hairs on the cheeks; hair of first abdominal segment long and white, of segments 2-7 largely black on the bases of segments and pale on the apices; hair of legs largely black. Head as broad as thorax; inner orbits converging slightly below; antennæ rather short, reaching to the tegulæ, flagellum very dark ferruginous beneath, black above; anterior margin of clypeus truncate; mandibles bidentate, black, the apical tooth long. Mesothorax and scutellum dull, very closely and finely punctured; disk of propodeum dark blue, dull; tegulæ very dark brown, with a blue punctured spot in front. Wings hyaline; basal nervure behind nervulus; second cubital cell about one and one-half times as long as first on marginal, receiving the first r. n. little farther from base than the second r. n. from apex. Abdomen with greenish reflections, especially toward the apices of the segments; segments with indistinct punctures, the punctureless apical margins moderately broad; apical margin of sixth dorsal segment weakly notched, pale ferruginous; seventh broadly and deeply notched; third ventral segment apparently emarginate, but concealed by the second. Legs black, pubescence predominantly black, except on the femora which have some pale hairs; hind basitarsi toothed; hind spurs of tibiæ straight; apical tarsi dark ferruginous.

Type: Male, No. 1553, Mus. Calif. Acad. Sci., collected by J. C. Thompson, May 5, 1912, at **San Francisco, California.**

8. **Osmia aprilina atrovirens** Sandhouse, new subspecies

This variety from the Pacific coast states is very like the type of *aprilina* Cockerell, described from Boulder, Colorado, but differs in the following respects: some black hairs on face, in some cases the hair on the face is largely black; hair of cheeks with a large percentage of black hairs intermixed—a few in *aprilina;* hair of mesothorax and scutellum with at least as

many black as white hairs; some black hairs on the pleura; color of tegument a darker green. The genitalia of *aprilina atrovirens* are apparently identical with those of *aprilina;* so this can hardly be a distinct species.

Type: Male, in collection of T. D. A. Cockerell, collected by C. F. Baker at **Claremont, California.** *Paratypes:* California: two males, Yosemite Valley, May 27, 1921 (E. C. Van Dyke); one male, Claremont (F. R. Cole); one male, Los Angeles Co. Nevada: one male, no data. Oregon: one male, Corvallis, June 18, 1899. Washington: 17 males, Seattle, April 4 to May 13, 1896. British Columbia: one male, Victoria, May 20, 1916 (R. C. Treherne).

The paratypes are represented by specimens in the collections of the California Academy of Sciences, United States National Museum, Canadian Department of Agriculture, and the Philadelphia Academy of Natural Sciences.

9. **Osmia peridonea** Sandhouse, new species

Male: About 9 mm. long; dark blue. Head as broad as thorax; antennæ black, as long as the thorax; hair of head all white, except some black hairs on the vertex and a few black hairs intermixed with the white on the cheeks; anterior margin of clypeus truncate, black. Dorsum of thorax dull, very closely punctured, pubescence long and white; scutellum with a median polished streak; hair of pleura largely black, with some white hairs about the tubercules; hair of sides of propodeum white; disk of propodeum a very dark, dull blue. Wings dusky; nervures black; basal nervure meeting nervulus; second cubital cell about one and one-half times as long as the first on marginal, receiving the first r. n. about 1/4 from base, and the second r. n. about 1/6 from apex. Abdomen robust, shining, with indistinct punctures; hair of first dorsal segment long and white, of second short and white, with some black hairs intermixed, of 3-6 black; punctureless apical margins of segments moderately broad, reddened; sixth and seventh dorsal segments strongly notched; third ventral segment emarginate. Legs black, the hind femora obscurely bluish; hair black, except some white hairs on the anterior femora.

Type: Male, No. 1554, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, June 6-12, 1917, at **Keen Camp, Riverside Co., California.** *Paratypes:* California: five males, same data as type; one male, Lower Lake, Lake Co., May 15, 1922 (E. P. Van Duzee).

10. **Osmia vana** Sandhouse, new species

Female: About 8 mm. long; brilliant green; pubescence, including scopa, white. Head normal; inner orbits converging slightly below; antennæ fuscous; entire face, including clypeus, with close but coarse punctures; clypeus and sides of face below insertion of antennæ bluish green; anterior margin of clypeus truncate, two brushes of orange hair beneath; mandibles tridentate, black, obscurely metallic at base. Mesothorax and scutellum shining between close, distinct punctures; the punctures of the scutellum a little farther apart; a median polished streak on scutellum; disk of propodeum concolorous with the thorax, dull, finely roughened; tegulæ brown, anterior portion green and punctate. Wings dusky hyaline; basal nervure meeting nervulus; first and second cubital cells equidistant on the marginal; second receiving first r. n. 1/4 from base, and the second r. n. 1/5 from apex. Abdomen shining, closely punctured; apical 1/5 of segments bluish; punctureless apical margins of segments very narrow; hair of apex of sixth dorsal segment fulvous. Legs metallic, more bluish green; hind tibial spurs slightly curved at the apex; hair on inner sides of basitarsi fulvous.

Differs from *O. granulosa* Cockerell, by the more coarsely punctured mesothorax and scutellum; tegulæ brown, with a greenish spot in front; color true green, rather than blue-green.

Differs from *gaudiosa* Cockerell, which has some black hairs on the face and mesothorax, and the tegulæ entirely metallic.

Type: Female, No. 1555, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, May 22, 1920, at **Pleyto, Monterey Co., California.** *Paratype:* San Mateo, California, July 4, 1911 (J. A. Kusche).

11. **Osmia kerminesina** Sandhouse, new species

Female: About 8 mm. long; species brilliant royal purple, including legs and tegulæ; pubescence black; scopa black. Head almost as wide as thorax; scape of antennæ purple, flagellum black; face with close, rather shallow punctures; clypeus more deeply punctured, the anterior margin black; mandibles black, tridentate, the bases purplish; hairs of lower cheeks long and curled. Mesothorax with coarse confluent punctures, on the disk the punctures are well separated, with minute punctures between the coarse punctures; scutellum coarsely and closely punctured, with a median polished streak; disk of propodeum concolorous with thorax; anterior margin of tegulæ punctured. Abdomen weakly punctured, the punctures largely piliferous; punctureless apical margins of segments moderately broad. Wings dusky; basal nervure going just basad of the

nervulus; second cubital cell a little longer than the first on the marginal, receiving the first r. n. about 1/3 from base and the second r. n. about 1/5 from apex.

Type: Female, No. 1556, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, June 6-12, 1917, at **Keen Camp, Riverside Co., California.**

12. **Osmia læta** Sandhouse, new species

Female: 8.5-9 mm. long; blue-green, with purplish reflections; scopa black. Head and thorax with close, but shallow punctures; head ordinary; orbits converging slightly below; hair of face all black except patches of white at sides of face; antennæ black; hair of cheeks white with black intermixed; clypeus more deeply punctured, anterior margin black, truncate, two brushes of orange hair beneath; mandibles black, tridentate; few white hairs on occiput. Hair of thorax white, with some black hairs intermixed on mesothorax and scutellum; a median polished streak on scutellum; disk of propodeum concolorus with thorax, finely roughened; tegulæ metallic, anterior margin punctate. Wings fusco-hyaline; basal nervure just basad of the nervulus; second cubital cell a little longer than first on marginal, receiving first r. n. 1/4 from base, and the second r. n. 1/5 from apex. Abdomen shining, the only punctures piliferous; hair of first dorsal segment white, of segments 2-5 largely black, with some white in the sub-marginal region; apex of sixth segment with black hair; punctureless apical margins of segments rather narrow. Legs metallic; hair black, fuscous on anterior and median basitarsi; hind tibial spurs straight.

Type: Female, No. 1557, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, May 10, 1922, at **Blue Lakes, Lake Co., California.** *Paratypes:* California: two females, Santa Cruz, June 1-2, 1919 (E. P. Van Duzee); two females, Fallen Leaf Lake, July, 1915 (E. C. Van Dyke and L. S. Rosenbaum); one female, Fairfax, Marin Co., July 9, 1911 (E. C. Van Dyke); one female, Kelseyville, Lake Co., May 15, 1922 (E. P. Van Duzee); one female, Muir Woods, Marin Co., May 4, 1913 (E. C. Van Dyke); one female, Huntington Lake, July 4, 1919 (E. P. Van Duzee); two females, Yosemite Valley, June 9, 1921 (E. C. Van Dyke); one female, Oak Glen Lodge, San Bernardino Co., July (F. C. Clark); one female, Soboba Springs, Riverside Co., June 5, 1917 (E. P. Van Duzee). Oregon: one female, Fremont National Forest, Klamath Co., June 18, 1922 (E. C. Van Dyke).

13. **Osmia rostrata** Sandhouse, new species

Female: About 9-10 mm. long; steel-blue; scopa black. Head subquadrate, broader than thorax, closely punctured; hair black and white intermixed, except on the vertex where it is black; antennæ black; mandibles broad, quadridentate, black; clypeus depressed in the upper middle portion; anterior margin produced in the middle to form a snout-like process, the margin fringed with orange hairs. Dorsum of thorax closely and finely punctured, with black and white hairs intermixed; scutellum with a median polished streak; hair of pleura, and of sides of propodeum white; tegulæ very dark brown, anterior portion metallic and punctured. Wings dusky hyaline; marginal cell somewhat fuliginous, basal nervure just before nervulus; first and second cubital cells of about equal length on marginal, second receiving first and second r. n. at about equal distances from base and apex respectively. Abdomen subglobose, shining, indistinctly punctured, the punctures largely piliferous; punctureless apical margins of segments 1 and 2 narrow, of 3-6 moderately broad; first dorsal segment with long white hair, 2-6 with short black hair, a few inconspicuous pale hairs intermixed. Legs black, with black pubescence; hind tibial spurs stout.

Easily distinguished from all American Osmias known to the writer by the peculiar clypeus.

Type: Female, No. 1558, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, April 21, 1919, at **Stone Cañon, Monterey Co., California.** *Paratype:* Bradley, Monterey Co., California, May 22, 1920 (E. P. Van Duzee).

14. **Osmia exilis** Sandhouse, new species

Female: Small, slender species, about 7 mm. long; grey-green; pubescence, including scopa, white, except some tawny hairs on the hind tarsi. Head normal; inner orbits converging below; antennæ black; clypeus convex, shining between large, shallow punctures; anterior margin truncate; face more closely and finely punctured; mandibles tridentate; cheeks below with long curled hairs. Mesothorax with well-separated punctures; scutellum with larger, more shallow punctures; tegulæ black. Wings somewhat dusky; basal nervure behind nervulus; second cubital cell strongly contracted above, about as long as first on marginal, receiving first r. n. little farther from base than the second r. n. is from apex. Abdomen shining; bases of segments rather weakly punctured; punctureless apical margins of segments moderately broad; apex of sixth dorsal segment pruinose. Legs black; femora obscurely grey-green.

Distinguished from other species with pale pubescence, by the small slender body, and the long curled hairs on the cheeks.

Type: Female, No. 1559, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, May 16, 1922, at **Blue Lakes, Lake Co., California.** *Paratypes:* California: seven females, same data as type; one female, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee).

15. **Osmia seclusa** Sandhouse, new species

Female: About 10 mm. long; blue, with greenish reflections; scopa black; pubescence pale. Head subquadrate, broader than thorax, very densely punctured; inner orbits converging slightly below; antennæ black; hair of clypeus pale fuscous; anterior margin of clypeus truncate, with two tufts of orange hair beneath; mandibles broad, black, quadridentate, with fulvous hair. Dorsum of thorax very closely and finely punctured; scutellum with a median polished streak; disk of propodeum dull blue; tegulæ very dark brown, punctate in front. Wings dusky, especially the apical part; basal nervure just behind, or meeting nervulus; second cubital cell strongly contracted above, hardly longer than first on marginal, receiving first r. n. almost 1/3 from base, and the second r. n. about 1/5 from apex. Abdomen broad, very finely and closely punctured, the punctures becoming finer on the apical margins of the segments; pubescence more dense on apices of segments, appearing to be almost hairbands; sixth segment pruinose; punctureless apical margins of segments very narrow. Legs black; hair on inner side of tarsi fuscous.

Very similar in general appearance to *O. canadensis* Cr. and *cognata* Cr., and, therefore, may be a Monilosmia. Cresson has described a male Monilosmia, *O. inurbana*, from the Pacific Coast region; so this may prove to be conspecific with *inurbana*.

Distinguished from *canadensis* Cr., by the greenish color, blue in *canadensis;* black scopa, white in *canadensis;* anterior margin of clypeus entire; basal nervure behind nervulus.

From *cognata* Cr., by the more finely and densely punctured abdomen; very narrow punctureless apical margins of abdominal segments; no black hairs on dorsum of abdomen; basal nervure behind nervulus.

Type: Female, No. 1560, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, May 22, 1920, at **Pleyto, Monterey Co., California.** *Paratypes:* California: one female, same data as type; three females, Mokelumne Hill, May (F. E. Blaisdell); two females, Bradley, Monterey Co., May 22, 1920 (E. P. Van Duzee); five females, hills back of Oakland, May 8, 1910

(E. C. Van Dyke); one female, Inverness, May 22, 1910 (E. C. Van Dyke); one female, Muir Woods, Marin Co., May 9, 1920 (E. C. Van Dyke); one female, Poway, San Diego Co., April 2, 1885 (F. E. Blaisdell); two females, Sacramento; one female, Humboldt. Washington: three females; Pullman, July (C. V. Piper); Idaho: one female, Paris, July 8, 1920, No. F4741 (F. E. Lutz); Oregon: ten females, Corvallis, June 7-11, 1898 (H. Viereck); British Columbia: one female, Vancouver, June 16, 1896 (Livingston).

The paratypes are represented by specimens in the collections of the United States National Museum, Philadelphia Academy of Natural Sciences, and American Museum of Natural History.

16. **Osmia sedula** Sandhouse, new species

Female: About 9-10 mm. long; slightly greenish blue; hair of head and thorax largely pale; scopa black. Head large; inner orbits converging slightly below; antennæ black; entire face closely punctured; clypeus very dark blue; anterior margin of clypeus shining black, truncate; mandibles black, quadridentate; hair of cheeks white, with a few black hairs intermixed, on the lower half of the cheeks the hairs are longer; hair at sides of face pure white, of median portion of face and of occiput white with long black hairs intermixed, of vertex black. Thorax clothed with white pubescence, some black hairs intermixed on mesothorax and scutellum; mesothorax and scutellum dull, very densely punctured; a median polished streak on scutellum; tegulæ black, with a few punctures in front; disk of propodeum color of thorax, slightly roughened. Wings faintly dusky; basal nervure meeting nervulus; second cubital cell a little longer than the first on marginal, receiving the first r. n. about 1/3 from base, and the second r. n. hardly 1/5 from apex. Abdomen rather broad, with close but shallow punctures; punctureless apical margins of segments quite narrow; hair of first dorsal segment white, of bases of segments 2-5 black, with quite conspicuous marginal bands of pale hair; sixth segment with fuscous hair. Legs black, with black hair; hind tibial spurs curved at the apex.

Type: Female, No. 1561, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, April 26, 1919, at **Atascadero, San Luis Obispo Co., California.** *Paratypes:* California: four females, same data as type; one female, Ross, Marin Co., April 28, 1916 (E. P. Van Duzee); one female, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee); one female, hills

back of Oakland, May 15, 1910 (E. C. Van Dyke). British Columbia: Nanaimo Biological Station, June 24, 1920 (Mrs. E. P. Van Duzee).

17. **Osmia celsa** Sandhouse, new species

Female: 11-12 mm. long; dark blue; scopa black; pubescence black, except for some white hairs on posterior side of propodeum, and first and second dorsal segments of abdomen. Head ordinary; antennæ black; inner orbits converging slightly below; face indistinctly punctured; clypeus black, anterior margin polished, truncate, two brushes of orange hair beneath; mandibles black, quadridentate; lower cheeks with long curled hairs. Mesothorax densely punctured, giving a rough appearance; scutellum with well-separated punctures, a median polished streak; disk of propodeum coriaceous; tegulæ black, the front punctured. Wings fuscohyaline; marginal cell more deeply infuscated; basal nervure just before nervulus; second cubital cell about twice as long as first on marginal, receiving first r. n. at least 1/4 from base, and the second r. n. less than 1/6 from apex. Abdomen shining, indistinctly punctured; punctureless apical margin of first segment narrow, of segments 2-5 broader. Legs black; hind tibial spurs stout, curved at apex; femora shining black.

Type: Female, No. 1562, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, June 2, 1919, at **Santa Cruz, California.** *Paratype:* San Mateo, California, May 19, 1918 (E. P. Van Duzee).

18. **Osmia proposita** Sandhouse, new species

Female: About 13 mm. long; very dark blue; hair of head all black, except some white hairs intermixed on sides of face and between antennæ; hair of pleura black, of dorsum of thorax black and white, with varying amounts of the two colors; hair of sides of propodeum and of first abdominal segment pure white; hair of legs black, of abdominal segments 2-7 largely black, with a few inconspicuous white hairs, especially on the median base of second segment; scopa black. Head subquadrate, as broad as thorax; inner orbits converging slightly below; closely punctured, appearing almost granular; antennæ black, cheeks below with many long curled hairs; mandibles quadridentate; anterior margin of clypeus truncate, with two brushes of orange hair beneath. Mesothorax dull, very closely punctured, giving it a rough appearance; scutellum with coarser, more scattered punctures; disk of propodeum dull; tegulæ very dark brown, punctured, obscurely bluish in front. Wings dusky; upper half of marginal cell smoky; basal nervure before

nervulus; second cubital cell twice as long as first on marginal, receiving first r. n. at least 1/4 from the base, and the second r. n. 1/6 from the apex. Abdomen rather shining, the bases of the segments with piliferous punctures; punctureless apical margins moderately broad. Legs black, hind tibial spurs curved at apex.

Superficially like *subpurpurea* Cockerell, from which it differs by the hair of pleura black; hair of cheeks all black, with many long curled black hairs below.

Type: Female, No. 1563, Mus. Calif. Acad. Sci., collected by E. C. Van Dyke, June 12, 1921, in **Yosemite Valley, California.** *Paratypes:* California: nine females, same data (June 9-30); one female, Huntington Lake, July 4, 1919 (E. P. Van Duzee); one female, Paradise Valley, Fresno Co., July 5, 1910 (E. C. Van Dyke); one female, Cayton, Shasta Co., July 11, 1918 (E. P. Van Duzee); one female, Carrville, Trinity Co., June 29, 1913 (E. C. Van Dyke); one female, Mokelumne Hill (F. E. Blaisdell); one female, Norval Flats, Lassen Co., May 31, 1920 (J. O. Martin); two females, Fallen Leaf Lake, July 12 and 23, 1915 (E. C. Van Dyke); one female, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee); two females, Kings River Cañon, Fresno Co., July 6, 1910 (E. C. Van Dyke); two females, Dunsmuir (Wickham). Washington: one female, Olympia, July 4, 1896; one female, Pullman, July 9 (C. V. Piper); one female, Blue Mountains, July 15, 1896 (C. V. Piper). Oregon: one female, Warner Mountains, Lake Co., June 19, 1922 (E. C. Van Dyke); three females, Fremont National Forest, Klamath Co., June 18, 1922 (E. C. Van Dyke). British Columbia: one female, Vernon, June 6, 1903; one female, Nanaimo Biological Station, June 24, 1920 (E. C. Van Dyke).

19. **Osmia visenda** Sandhouse, new species

Female: About 11-12 mm. long; dark blue; scopa black; pubescence black, except some white hairs on scutellum and first abdominal segment. Head normal; antennæ black; face indistinctly punctured; supraclypeal area with anastomosing punctures; anterior margin of clypeus truncate, black, two brushes of orange hair beneath; mandibles black,

apically with ferruginous hair; quadridentate. Thoracic dorsum closely punctured; scutellum with a median polished streak; disk of propodeum dull, concolorous with the thorax; tegulæ metallic dark blue, anterior margin punctured. Wings dusky hyaline; basal nervure just basad of the nervulus; second cubital cell about one and one-half times as long as first on marginal, receiving the first r. n. 1/4 from base, and the second r. n. near apex. Abdomen shining, the punctures indistinct; punctureless apical margins of segments rather narrow. Legs black; hind tibial spurs stout, curved at apex.

Type: Female, No. 1564, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, July 4, 1919, at **Huntington Lake, Fresno Co., California.** *Paratypes:* California: one female, Tallac, El Dorado Co. (W. M. Giffard); one female, San Francisco, May 30, 1911 (E. C. Van Dyke). Idaho: one female, Montpelier, July 6, 1920, No. F4739 (F. E. Lutz, in collection of American Museum of Natural History).

20. **Osmia pellax,** Sandhouse, new species

Female: About 9 mm. long; dark purplish blue; scopa black; pubescence predominantly black. Head and thorax closely punctured; head ordinary; antennæ black, flagellum brown beneath; hair of head black, except some white hairs intermixed with the black on the face; anterior margin of clypeus truncate, two tufts of orange hair beneath; mandibles black, tridentate, the apical tooth long. Hair of dorsum of thorax white, with some black hairs intermixed, of pleura and sides of propodeum black; tufts of white hair behind the wings; tegulæ black, the anterior portion blue and punctate. Wings quite dusky; basal nervure meeting nervulus; second cubital cell a little longer than the first on marginal, receiving first r. n. 1/4 from base, and the second r. n. 1/5 from apex. Hair of first dorsal segment of abdomen white, of remaining segments black, except for a few inconspicuous white hairs on median base of second; punctureless apical margins of segments broad. Legs black, with black hairs.

Type: Female, No. 1565, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, June 6-12, 1917, at **Keen Camp, Riverside Co., California.** *Paratypes:* four females, same data.

Keys to the Osmias of the Pacific Coast region:

Males

—. Species brilliant, usually green or blue-green, sometimes purple *(cobaltina)*, or with purplish reflections *(ribifloris)*..... 1
—. Species dark blue or green, the abdomen sometimes with tints of royal purple 5
1. Larger species; hair of pleura black; purple, or darker green, with purple tints 2
—. Smaller species; hair of pleura pale; pubescence largely or entirely pale; very brilliant green..... 3
2. Species purple; sixth dorsal segment of abdomen weakly notched; seventh dorsal segment strongly notched; pubescence in general more like bristles and shorter.....*cobaltina* Cresson
—. Species green with purple tints; sixth dorsal segment of abdomen entire; seventh dorsal segment weakly notched; pubescence long and not at all bristle-like.....*ribifloris* Cockerell
3. Abdomen dorsally with some black hair; antennæ about as long as thorax ..... *bennettæ* Cockerell
—. Abdomen dorsally with pale hair; antennæ shorter..... 4
4. Smaller golden green species, less than 6 mm. long; flagellum testaceous beneath; second cubital cell receiving the second r. n. almost as far from apex as the first r. n. from base..... .....*kincaidii* Cockerell
—. Larger blue-green species, 7-8 mm. long; flagellum dark ferruginous beneath; second cubital cell receiving first r. n. about twice as far from base as the second r. n. from apex..... .....*regulina* Cockerell
5. Second ventral segment of abdomen ending medially in a rounded lamelliform process; flagellum strongly crenulate beneath *(Acanthosmioides)* 6
—. Second ventral segment of abdomen without such a process; flagellum not crenulate beneath (moniliform in *inurbana*)..... 9
6. Flagellum light ferruginous, the last segment flattened and black; pubescence of abdomen black.....*ashmeadii* Titus
—. Flagellum of one color only, the last segment not so flattened; pubescence of abdomen pale or partly black, not all black..... 7
7. Species large, 14 mm. long, bluish grey-green; dorsal segments 3-7 of abdomen with black hair on the basal portion..... .....*vanduzeci* Sandhouse
—. Species smaller; olive-green, or dark blue-green..... 8
8. Olive-green; pubescence fulvous, nowhere with black hairs; hind basitarsi broad at the apex, and truncate *odontogaster* Cockerell
—. Dark blue-green; pleura posteriorly with some black hairs; hair of dorsal segments 3-7 of abdomen largely black..... .....*nifoata* Cockerell
9. Middle tarsi thickened..... 10
—. Middle tarsi not modified..... 13

10. Middle tarsi little thickened, or hind basitarsi very broad; sixth dorsal segment of abdomen weakly notched; seventh dorsal segment strongly notched..... 11
—. Middle tarsi more strongly modified; hind basitarsi ordinary; sixth dorsal segment of abdomen entire; seventh dorsal segment entire, or broadly emarginate..... 12
11. Pubescence not all pale; hind basitarsi very broad, and broadly toothed; dorsal segments 3-7 of abdomen with pubescence largely black; middle of second ventral segment thickened apically .....*kenoyeri* Cockerell
—. Pubescence all pale; hind basitarsi less modified than above; second ventral segment of abdomen not so thickened apically .....*paradisica* Sandhouse
12. Apical joint of flagellum flattened; sixth and seventh dorsal segments of abdomen truncate, fringed with long black hairs; some black hair on the pleura.....*vandykei* Sandhouse
—. Flagellum ordinary; sixth dorsal segment of abdomen entire, but rounded, not truncate; sixth and seventh dorsal segments not so fringed with long black hairs; hair on pleura pale..... .....*universitatis* Cockerell
13. Pubescence entirely pale..... 14
—. Pubescence with some black hairs..... 21
14. Flagellum moniliform; hind basitarsi clavate; hind tibial spur long and curved *(Monilosmia)*.....*inurbana* Cresson
—. Flagellum ordinary; hind basitarsi not as above..... 15
15. Sixth dorsal segment of abdomen entire; hind basitarsi apparently not toothed; head broad..... 16
—. Sixth dorsal segment of abdomen notched in the middle; hind basitarsi toothed; head ordinary..... 19
16. Sixth dorsal segment of abdomen truncate; seventh dorsal segment broad, with a very broad and shallow emargination; apical margins of abdominal segments concolorous with the bases..... .....*bakeri* Sandhouse
—. Sixth dorsal segment of abdomen rounded or produced in the middle; seventh dorsal segment acutely notched; apical margins of abdominal segments brownish or reddish..... 17
17. Species very small, 5-5.5 mm. long; flagellum as long as thorax; sixth dorsal segment of abdomen rounded at apex, but not produced in the middle; second cubital cell contracted to about one-half above.....*exigua* Cresson
(Specimens determined by the writer from the description.)
—. Sixth dorsal segment of abdomen produced in the middle, subsinuate at the sides; second cubital cell less strongly contracted 18
18. Legs black; tegulæ black; upper half of marginal cell smoky..... ..... *davidsoniella* Cockerell
—. Legs green; tegulæ brown, with a green spot in front; marginal cell not smoky.....*nemoris* Sandhouse

19. Tegulæ and tibial spurs pale testaceous; flagellum pale rufo-testaceous ..... *titusi* Cockerell
—. Tegulæ black or metallic; tibial spurs brown; flagellum brown or black 20
20. Upper half of marginal cell fuliginous; scutellum coarsely punctured; legs black..... *texana* Cresson
—. Marginal cell quite clear; scutellum very closely and finely punctured; legs metallic..... *eutrichosa* Cockerell
21. Large species, 12-13 mm. long; sixth dorsal segment of abdomen broad; hair of dorsal segments 1 and 2 entirely pale; hair of thorax entirely pale..... *integra* Cresson
—. Smaller species; sixth dorsal segment of abdomen rounded; pubescence not as above..... 22
22. Hair of pleura white (basitarsi toothed except for *seneciophila)* 23
—. Hair of pleura black, or with some black hairs present..... 29
23. Some black hairs on dorsum of thorax; legs metallic..... 24
—. No black hairs on dorsum of thorax; legs usually black (somewhat metallic in *wheeleri* and *mertensiæ,* which have no black hairs on thorax)..... 25
24. Small green species, 8 mm. long; head broader than long; some black hairs on face..... *aprilina* Cockerell
—. Larger steel blue species, 10 mm. long; head ordinary; no black hairs on face..... *solitaria* Sandhouse
25. Legs metallic; smaller species..... 26
—. Legs black, with no metallic tints; larger species..... 27
26. Flagellum bright ferruginous beneath; pale olive-green species; some black hairs on vertex..... *mertensiæ* Cockerell
—. Flagellum dusky beneath; dark blue-green species; no black hairs on vertex..... *wheeleri* Cockerell
27. Basal nervure before nervulus; marginal cell with a fuliginous streak in the upper half; sixth dorsal segment of abdomen strongly notched..... *theta* Sladen MSS.
(This species, which may prove to be the male of *O. subpurpurea* Cockerell, was named by Sladen in manuscript. A description of the type will be given by the writer in an early number of the Canadian Entomologist.)
—. Basal nervure behind nervulus; marginal cell without such a streak; sixth dorsal segment of abdomen weakly notched..... 28
28. Apical margin of sixth dorsal segment of abdomen pale ferruginous; pubescence of abdominal segments 3-6 black on the bases and pale on the apical portions..... *enixa* Sandhouse
—. Apical margin of sixth dorsal segment of abdomen not reddened; pubescence of segments 3-6 entirely black *seneciophila* Cockerell
29. Sixth dorsal segment of abdomen entire; hind basitarsi apparently not toothed; legs black..... 30
—. Sixth dorsal segment of abdomen notched; hind basitarsi toothed; legs somewhat metallic..... 31

30. Dark green, or blue-green; seventh dorsal segment of abdomen entire; third ventral segment with a deep broad notch..... .....*lignaria* Say
—. Dark blue; abdomen purplish blue; seventh dorsal segment of abdomen notched; third ventral segment hardly notched..... .....*montana* Cresson
31. Small species, less than 8 mm. long; head broader than long; sixth dorsal segment of abdomen weakly notched; hair of face black and white intermixed.....*aprilina atrovirens* Sandhouse
—. Larger species, 9-10 mm. long; head ordinary; sixth dorsal segment of abdomen strongly notched; apical margins of abdominal segments reddened, bases blue; hair of face all white..... ..... *peridonea* Sandhouse

Females

—. Brilliant species, usually blue-green, sometimes purplish, or with purple reflections 1
—. Species with at least the thorax dark blue or green, the abdomen sometimes a blue-purple..... 12
1. Scopa pale 2
—. Scopa black 3
2. Blue-green species; tegulæ purple; punctureless apical margins of abdominal segments very narrow.....*granulosa* Cockerell
—. Golden green species; tegulæ brown with a green spot in front; punctureless apical margins of abdominal segments broader..... .....*vana* Sandhouse
3. Pubescence black 4
—. Pubescence largely pale, or at least with some pale hairs present.. 8
4. Robust species; usually dark green, sometimes purplish; pubescence long, not at all bristle-like.....*ribifloris* Cockerell
—. Normal or slender species; blue-green or a true purple; pubescence short and more bristle-like..... 5
5. Elongate species; head narrow, orbits parallel; hair of dorsum of thorax often reddish.....*fulgida* Cresson
—. Normal species; orbits usually converging slightly below; hair not at all reddish..... 6
6. Large blue-green species, 14 mm. long.....*viridimicans* Cockerell
—. Smaller royal purple species..... 7
7. Tegulæ entirely metallic; body all of one color; 8 mm. long; mesothorax shining between rather coarse punctures..... ..... *kerminesina* Sandhouse
—. Tegulæ brown with a purple spot in front; clypeus, sides of face, and apical margins of abdominal segments a true purple, the rest of body a royal purple; 10 mm. long; mesothorax densely punctured .....*basilissa* Cockerell

8. Hair of pleura black..... 9
—. Hair of pleura white..... 10
9. Hair of face short and black; clypeus and sides of face below a true purple; species largely purple.....*cobaltina* Cresson
—. Face with long black bristles; patches of white hair at the sides of the face; clypeus and sides of face dark blue-green; species largely blue-green.....*bruneri* Cockerell
10. Legs brown, femora obscurely metallic, hair of legs pale; abdomen dorsally with pale pubescence, very closely punctured; punctureless apical margins of abdominal segments very narrow..... .....*regulina* Cockerell
—. Legs metallic, with pubescence largely black; some black hairs on dorsum of abdomen, more sparsely punctured; punctureless apical margins of abdominal segments broader..... 11
11. Larger, blue-green species; hair of face black, except for patches of white hair at the sides.....*læta* Sandhouse
—. Smaller, golden green species; white hairs on face not confined to the sides .....*kincaidii* Cockerell
12. Clypeus modified 13
—. Clypeus ordinary 20
13. Clypeus almost entirely polished and impunctate; mandibles very long; cheeks broad..... 14
—. Not so 15
14. Cheeks armed; hair of first dorsal segment of abdomen white, of dorsum of thorax largely white; patches of hair above the antennæ white.....*armaticeps* Cresson
—. Cheeks unarmed; pubescence entirely black...*quadriceps* Cresson
15. Apical margin of clypeus very thick, otherwise unmodified..... ..... *subornata* Cockerell
(Subornata was considered by Cockerell to be a submelanic form of *megacephala* Cresson.)
—. Clypeus not thickened at the apical margin, emarginate or toothed; with a process in *rostrata*..... 16
16. Clypeus produced in the middle to form a process; not emarginate or toothed.....*rostrata* Sandhouse
—. Clypeus emarginate or toothed..... 17
17. Clypeus broadly emarginate; hair of pleura black, of abdomen largely black, of head and thoracic dorsum largely black..... .....*lignaria* Say
—. Clypeus not so broadly or deeply emarginate, with two teeth; pubescence, exclusive of scopa, pale..... 18
18. Scopa white; smaller, grayish blue-green species; abdomen with indistinct punctures.....*coloradensis* Cresson
—. Scopa black; larger, steel blue species; abdomen strongly punctured 19
19. Mandibles with a large basal tubercle.....*mandibularis* Cresson
—. Mandibles without such a tubercle.....*faceta* Cresson

20. Scopa pale 21
—. Scopa black 22
21. Tegulæ and tibial spurs testaceous; larger, more robust species; hair of cheeks not long and curled.....*titusi* Cockerell
—. Tegulæ and tibial spurs brown; small, slender species; hair of lower cheeks long and curled.....*exilis* Sandhouse
22. Pubescence, exclusive of the scopa, entirely pale, head broad; mandibles broad; species very closely and finely punctured.....
.....*seclusa* Sandhouse
—. Some black hairs present, or pubescence entirely black; usually less densely punctured..... 23
23. Hair of pleura light..... 24
—. Hair of pleura black..... 28
24. (Some black hairs intermixed with the pale on dorsum of thorax) Face clothed with long black bristles; slender species.....
..... *pentstemonis* Cockerell
—. Face with shorter hairs, hairs black and white intermixed; more robust species 25
25. Small species, 8 mm. long; flagellum dark ferruginous beneath; legs obscurely metallic.....*phaceliæ* Cockerell
—. Larger species; 10 mm. long, or longer; flagellum black..... 26
26. Large species, 13-14 mm. long; clypeus black; some long curled black hairs on lower half of cheeks.....*subpurpurea* Cockerell
—. Smaller species; cheeks without such long and curled hairs..... 27
27. Blue species; mesothorax quite coarsely punctured; legs strongly metallic; tegulæ bluish.....*clarescens* Cockerell
—. Blue-green species; mesothorax very finely punctured; legs black; tegulæ dark brown.....*sedula* Sandhouse
28. Pubescence entirely black..... 29
—. Pubescence not entirely black, some white hairs present..... 33
29. (The following portion in quotation marks is a key by Cockerell)[1]. "Legs at least partly metallic; clypeus and sides of face purple
.....*gabrielis* Cockerell
—. Legs black, not metallic..... 30
30. Clypeus shining, with large well-separated punctures.....
.....*nassa* Cockerell
—. Clypeus granular from minute punctures..... 31
31. Mandibles tridentate .....*casta* Cockerell
—. Mandibles quadridentate 32
32. Abdomen deep purple, dullish.....*cara* Cockerell
—. Abdomen rather steel-blue, shining.....*putata* Cockerell"
33. Face clothed with long black bristles; tegument of front black, rough .....*wilmattæ* Cockerell
—. Face clothed with short hairs, no bristles on face; tegument of front not black and rough (*cyanosoma* has bristles shorter than *wilmattæ*, but is much smaller, legs metallic, tegument of front not black) 34

34. Legs metallic 35
—. Legs black, not metallic..... 37
35. Small species, about 7 mm. long; tegulæ brown, metallic in front; tufts of white hair behind wings.....*cyanosoma* Cockerell
(Cyanosoma is very like *pentstemonis,* except for the darker pubescence.)
—. Larger species; tegulæ metallic; no tufts of white hair behind wings 36
36. Dark blue, without purple tints; scutellum without a median polished streak .....*cyanopoda* Cockerell
—. Dark blue, with purplish tints, especially on the lower half of face and apical margins of abdominal segments; scutellum with a median polished streak.....*sanctæ-rosæ* Cockerell
37. Cheeks with long curled black bristles..... 38
—. Cheeks without such bristles..... 40
38. Hair of face entirely black; hair of thorax black, except for some white hairs on posterior surface of propodeum..*celsa* Sandhouse
—. Some white hairs on face; some white hairs on dorsum of thorax 39
39. Larger species, 13 mm. long; dark blue-green; white hairs intermixed with the black between the antennæ as well as on sides of face; abdomen densely punctured.....*proposita* Sandhouse
—. Smaller species, 10 mm. long; dark purplish blue; white hairs confined to the sides of the face; abdomen more sparsely punctured .....*pogonigera* Cockerell
40. Head subquadrate; cheeks broad..... 41
—. Head ordinary 43
41. Mesothorax dull black, with well-separated punctures; clypeus dull, and with punctation similar to that of the mesothorax.... ..... *grinnelli* Cockerell
—. Mesothorax closely, and more finely punctured..... 42
42. Clypeus closely punctured; hair of mesothorax white, with an interalar band of black hairs; marginal cell quite clear..... .....*wardiana* Cockerell
—. Clypeus shining between well-separated punctures; hair of mesothorax black and white intermixed, not banded; apex of marginal cell smoky.....*pascoensis* Cockerell
43. Hair of dorsum of thorax pale..... 44
—. At least some black hairs on the dorsum of thorax..... 46
44. Hair of mesothorax and scutellum white; small species 8 mm. long .....*grindeliæ* Cockerell
—. Hair of mesothorax and scutellum fulvous; larger species, 11-16 mm. long 45
45. Very large, 16 mm. long; olive green; clypeus dull black, very densely punctured; punctureless apical margins of abdominal segments less than 1/4 as wide as segments.....*longula* Cresson

[1] Pomona Journal of Ent. & Zool., Vol. VIII, No. 2, June, 1916, p. 54.

—. Smaller, 11 mm. long; blue-green; clypeus dark blue, less closely punctured; punctureless apical margins of abdominal segments about 1/3 as wide as segments.....*kenoyeri* Cockerell

46. Hair of face entirely black..... 47
—. Some white hairs on face..... 49

47. Small, green species, 7 mm. long; hair on sides of propodeum white .....*tristella* Cockerell
—. Larger, blue, or greenish blue species; hair on sides of propodeum black 48

48. Entire body dark blue; tegulæ metallic; hair of mesothorax and scutellum predominantly black; scutellum with a median polished streak .....*visenda* Sandhouse
—. Mesothorax blue-green; abdomen greenish blue; tegulæ black; hair of mesothorax predominantly pale; scutellum without a median polished streak.....*nigrifrons* Cresson

49. Entire sides of face clothed with pale hairs; hair of cheeks pale, with a few black hairs intermixed..... 50
—. Sides of face with inconspicuous pale hairs, or white hairs confined to middle of face; hair of cheeks black..... 51

50. Smaller, 8 mm. long; mesothorax and scutellum shining between rather close punctures; hair of scutellum white, with a few black hairs intermixed.....*melanopleura* Cockerell
—. Larger, 11 mm. long; mesothorax and scutellum dull, very densely punctured; hair of scutellum entirely pale..... .....*nigrobarbata* Cockerell

51. Larger, 12-13 mm. long; mesothorax shining between distinctly separated punctures; supraclypeal area largely polished, with a few confluent punctures; marginal cell with a fuliginous streak .....*leonis* Cockerell
—. Smaller, not over 10 mm.; mesothorax densely punctured; supraclypeal area punctured; marginal cell without a fuliginous streak 52

52. Hair of mesothorax largely pale, with a few black hairs intermixed; blue-green species; hair of scutellum pale; mesothorax very finely punctured.....*pellax* Sandhouse
—. Hair of mesothorax largely, or entirely black; dark blue species; hair of scutellum largely black, with pale hairs on the apex; mesothorax more coarsely and roughly punctured (Specimens determined by writer from description)....*atrocyanea* Cockerell

The following records from the collection of the California Academy of Sciences are new:

21. **Osmia lignaria** Say

Kansas: 2 females, Lawrence, May 13, 1911 (F. X. Williams).
California: 17 females, Mokelumne Hill, March and April (F. E. Blaisdell);

7 females, Potholes, Imperial County, April 8, 1923 (E. P. Van Duzee);
2 females, Jamesburg, Monterey Co., May 17, 1920 (L. S. Slevin);
3 females, Yosemite Valley, May 12-24, 1921 (E. C. Van Dyke);
1 female, Santa Cruz, June 2, 1919 (E. P. Van Duzee);
1 female, San Anselmo, April 16, 1912 (E. P. Van Duzee);
3 females, Sobre Vista, Sonoma Co., April 20-May 12, 1910 (J. A. and A. V. Kusche);
14 females and 1 male, S. Sonoma Co., March 17-April 16, 1911 (J. A. Kusche);
2 males, Oakdale (J. G. Grundel).

Oregon: 4 females, Warner Lake, Lake County, June 19, 21, 1922 (E. C. Van Dyke).

British Columbia: 2 females, Nanaimo Biol. Station, June 23- 24, 1920 (E. P. Van Duzee).

Utah: 1 female, Mt. Timpanogos, July 8, 1922 (E. P. Van Duzee).

22. Osmia montana Cresson

California: 3 males, Yosemite Valley, May 22-June 28, 1921 (E. C. Van Dyke).

Oregon: 4 males, Fremont National Forest, Klamath Co., June 18, 1922 (E. C. Van Dyke).

23. Osmia quadriceps Cresson

California: 2 females, Mokelumne Hill (F. E. Blaisdell);
1 female, Blue Lakes, Lake Co., May 16, 1922 (E. P. Van Duzee);
1 female, Blue Lakes, Alpine County, Aug. (F. E. Blaisdell);
1 female, Sobre Vista, Sonoma Co., June 10, 1910 (J. A. Kusche);
1 female, Yosemite Valley, June 10, 1921 (E. C. Van Dyke);
2 females, Santa Cruz, June 6, 1919 (E. P. Van Duzee);
2 females, Guerneville, Sonoma County, May 31, 1910 (E. C. Van Dyke);
8 females, Fallen Leaf Lake, June 20-July 17, 1915 (E. C. Van Dyke and L. S. Rosenbaum);

Oregon: 1 female, Warner Mts., Lake County, June 19, 1922 (E. C. Van Dyke);
1 female, Hood River, June 12, 1920 (E. C. Van Dyke);
5 females, Fremont National Forest, Klamath County, June 18, 1922 (E. C. Van Dyke).

24. Osmia armaticeps Cresson

Oregon: 1 female, Steen Mts., Harney County, June 25, 1922 (E. C. Van Dyke);
1 female, Wallowa Mts., Baker County, July 5, 1922 (E. C. Van Dyke).

25. Osmia ribifloris Cockerell

California: 9 females, Mokelumne Hill, Feb. and Mar. (F. E. Blaisdell).
Arizona: 1 female and 1 male, Chiricahua Mts., Cochise County, March 26, 1917 (V. W. Owen).

26. Osmia subpurpurea Cockerell

Washington: 1 female, Longmire, Rainier National Park, July 27, 1920 (E. C. Van Dyke).
Oregon: 1 female, Sparta, Baker County, July 2, 1922 (E. C. Van Dyke);
1 female, Crater Lake, July 17, 1922 (E. C. Van Dyke).
British Columbia: 1 female, Nanaimo Biol. Station, June 24, 1920 (E. C. Van Dyke).
California: 9 females, Huntington Lake, July 5-17, 1919 (E. P. Van Duzee, F. E. Blaisdell and F. C. Clark);
1 female, Yosemite Valley, July 4, 1921 (E. C. Van Dyke);
1 female, Inverness, May 22, 1910 (E. C. Van Dyke);
3 females, Fallen Leaf Lake, July 13 and 19, 1915 (E. C. Van Dyke);
2 females, Pyramid Peak, El Dorado Co., Aug. 8, 1912 (E. C. Van Dyke).
Utah: 2 females, Salt Lake City, June 27, July 3, 1922 (E. P. Van Duzee).

27. Osmia faceta Cresson

California: 1 female, Bradley, Monterey Co., May 22, 1920 (E. P. Van Duzee);
1 female, Fairfax, May 25, 1919 (E. P. Van Duzee);
2 females, Yosemite Valley, June 13, 1921 (E. C. Van Dyke).
Oregon: 1 female, Colestin, Jackson Co., July 30, 1918 (E. P. Van Duzee).

28. Osmia nassa Cockerell

California: 1 female, Cisco, July, 1920 (Mrs. H. E. Ricksecker);
1 female, Goumaz, Lassen Co., July 17, 1919 (R. Hopping);
5 females, Fairfax, Marin Co., April 21, 1907 (E. C. Van Dyke);
6 females, Sobre Vista, Sonoma Co., May 8-July 12, 1910 (J. A. Kusche);
1 female, Mokelumne Hill (F. E. Blaisdell);
3 females, S. Sonoma Co., June 19-22, 1910 (J. A. Kusche);
1 female, Fallen Leaf Lake, July, 1915 (L. S. Rosenbaum);
1 female, Kings River Cañon, Fresno Co., July 7, 1910 (E. C. Van Dyke);
1 female, Santa Cruz Isd., May 18, 1919 (E. P. Van Duzee).

29. Osmia gabrielis Cockerell

California: 2 females, Mokelumne Hill (F. E. Blaisdell);
4 females, Sobre Vista, Sonoma Co., April 8-May 2, 1920 (J. A. Kusche);
1 female, Soboba Springs, Riverside Co., June 5, 1917 (E. P. Van Duzee);
1 female, Blue Lakes, Lake County, May 16, 1922 (E. P. Van Duzee);
1 female, Yosemite Valley, June 12, 1921 (E. C. Van Dyke);
1 female, Carrville, Trinity Co., July 22, 1913 (E. C. Van Dyke);
1 female, Mt. Tamalpais, Marin County, June 20, 1909 (E. C. Van Dyke);
2 females, San Francisco Co., April 20, 1913, and May 7, 1921 (E. C. Van Dyke and J. A. Kusche);
3 females, Bear Valley, San Bernardino Mountains, Aug. 1913 (F. C. Clark);
3 females, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee).

30. Osmia pascoensis Cockerell

California: 1 female, Blue Lakes, Lake Co., May 16, 1922 (E. P. Van Duzee);
1 female, Huntington Lake, Fresno Co. (F. C. Clark).
Oregon: 2 females, Hood River, June 12, 1920 (E. C. Van Dyke).

31. Osmia wardiana Cockerell

California: 3 females, Huntington Lake, Fresno Co., July 7-16, 1919 (E. P. Van Duzee and F. E. Blaisdell);
1 female, Kings River Cañon, Fresno Co., July 8, 1910 (E. C. Van Dyke);
2 females, Fallen Leaf Lake, July 1915 (L. S. Rosenbaum);
3 females, Warner Mts., Lake Co., June 19, 1922 (E. C. Van Dyke);
1 female, Yosemite Valley, June 30, 1921 (E. C. Van Dyke).
Oregon: 1 female, Steen Mts., Harney Co., June 24, 1922 (E. C. Van Dyke).
Utah: 1 female, Park City, July 2, 1922 (E. P. Van Duzee).

32. Osmia nigrifrons Cresson

California: 1 female, San Francisco, May 5, 1912 (J. C. Thompson);
1 female, Fairfax, May 11, 1919 (E. P. Van Duzee);
1 female, Stone Cañon, Monterey Co., April 21, 1919 (E. P. Van Duzee);
27 females, Cazadero, April 12, 1918 (E. P. Van Duzee).
British Columbia: 1 female, Nanaimo Biol. Station, June 24, 1920 (E. P. Van Duzee).

33. Osmia leonis Cockerell

Oregon: 1 female, Steen Mts., Harney Co., June 25, 1922 (E. C. Van Dyke).

34. Osmia cobaltina Cresson

Oregon: 1 female, Steen Mts., Harney Co., June 24, 1922 (E. C. Van Dyke).
California: 1 female, Fallen Leaf Lake, July, 1915 (L. S. Rosenbaum);
1 female, Claremont (C. H. Muntall);
1 female, Huntington Lake, Fresno Co., July 16, 1919 (F. C. Clark).
Utah: 1 female, Logan, July 18, 1922 (E. P. Van Duzee);
2 females, Park City, July 2-3, 1922 (E. P. Van Duzee).

35. Osmia regulina Cockerell

California: 4 females, Pleyto, Monterey Co., May 22, 1920 (E. P. Van Duzee);
1 female Cayton, Shasta Co., July 15, 1918 (E. P. Van Duzee);
1 female, Yosemite Valley, June 30, 1921 (E. C. Van Dyke);
18 females, S. Sonoma County, June 19 and July 1, 1910 (J. A. Kusche);
2 females, Alameda, May 12, 1918 (E. P. Van Duzee);
2 females, Blue Lakes, Lake Co., May 16, 1922 (E. P. Van Duzee);
1 female, Bryson, May 18, 1920 (E. P. Van Duzee);
1 female, Sacramento, May 27, 1918 (E. P. Van Duzee).

36. Osmia pentstemonis Cockerell

California: 1 female, Fallen Leaf Lake, July 2, 1915 (E. C. Van Dyke);
1 female, Huntington Lake, July 9, 1919 (F. C. Clark).
Washington: 1 female, Paradise Valley, Mt. Rainier, July 19, 1920 (E. C. Van Dyke).

37. Osmia phaceliæ Cockerell

California: 3 females, Pleyto, Monterey Co., May 22, 1920 (E. P. Van Duzee);
5 females, Huntington Lake, Fresno Co., July 7-27, 1919 (E. P. Van Duzee and F. E. Blaisdell);
1 female, Kelseyville, Lake Co., May 15, 1922 (E. P. Van Duzee);
1 female, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee);
1 female, Mokelumne Hill, April (F. E. Blaisdell).
British Columbia: 2 females, Nanaimo Biol. Station, June 23, 1920 (E. P. Van Duzee).
Utah: 1 female, Park City, July 2, 1922 (E. P. Van Duzee);
2 females, Vivian Park, July 7, 1922 (E. P. Van Duzee).

38. **Osmia cyanosoma** Cockerell

California: 3 females, Yosemite Valley, June 9, 1921 (E. C. Van Dyke);
2 females, Fallen Leaf Lake, June 29, and July, 1915 (E. C. Van Dyke and L. S. Rosenbaum);
1 female, Paradise Valley, Fresno Co., July 15, 1910 (E. C. Van Dyke).
Washington: 2 females, North Bend, King Co., July 8-10, 1920 (E. P. Van Duzee).
Oregon: 1 female, Colestin, Jackson Co., July 30, 1916 (E. P. Van Duzee);
1 female, Hood River, June 12, 1920 (E. C. Van Dyke).
Utah: 1 female, Daniels Cañon, Heber, July 5, 1922 (E. P. Van Duzee);
1 female, Vivian Park, July 7, 1922 (E. P. Van Duzee).

39. **Osmia nigrobarbata** Cockerell

California: 1 female, Bradley, Monterey Co., May 22, 1920 (E. P. Van Duzee);
1 female, Stone Cañon, Monterey Co., May 27, 1919 (E. P. Van Duzee).

40. **Osmia kincaidii** Cockerell

California: 7 males and 1 female, Bryson, April 25-27, 1917, and May 18, 1920 (E. P. Van Duzee);
1 male, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee);
2 males and 1 female, Fallen Leaf Lake, June 22 and July, 1915 (E. C. Van Dyke and L. S. Rosenbaum);
1 male, Stone Cañon, Monterey Co., April 21, 1919 (E. P. Van Duzee);
1 male, Blue Lakes, Lake Co., May 16, 1922 (E. P. Van Duzee);
2 males, Pleyto, Monterey Co., May 22, 1920 (E. P. Van Duzee);
1 female, Kelseyville, Lake Co., May 15, 1922 (E. P. Van Duzee);
1 female, Yosemite Valley, June 9, 1921 (E. C. Van Dyke).

41. **Osmia integra** Cresson

California: 1 male, San Francisco, April 20, 1913 (E. C. Van Dyke).

42. **Osmia universitatis** Cockerell

California: 1 male, Bryson, May 18, 1920 (E. P. Van Duzee).

43. **Osmia mertensiæ** Cockerell

California: 1 male, Yosemite Valley, June 28, 1921 (E. C. Van Dyke).

44. **Osmia wheeleri** Cockerell

California: 1 male, Fallen Leaf Lake, July 15, 1915 (E. C. Van Dyke);
1 male, Yosemite Valley, June 10, 1921 (E. C. Van Dyke);
1 male, Keen Camp, Riverside Co., June 6-7, 1917 (E. P. Van Duzee);
1 male, Huntington Lake, Fresno Co., July 7, 1919 (F. E. Blaisdell).

45. **Osmia theta** Sladen MSS.

California: 1 male, Fallen Leaf Lake, July 1915 (E. S. Rosenbaum);
1 male, Huntington Lake, Fresno Co., July 7, 1919 (F. E. Blaisdell).

46. **Osmia grindeliæ** Cockerell

California: 2 females, Bear Valley, San Bernardino Mts., Aug. 1913 (F. C. Clark).

47. **Osmia bennettæ** Cockerell

California: 1 male, Blue Lakes, Lake Co., May 16, 1922 (E. P. Van Duzee);
1 male, Santa Cruz, June 1, 1919 (E. P. Van Duzee).

48. **Osmia bruneri** Cockerell

Oregon: 2 females, Wallowa Mts., Baker Co., July 5, 1922 (E. C. Van Dyke);
1 female, Fremont National Park, Klamath Co., June 18, 1922 (E. C. Van Dyke);
1 female, Crater Lake, July 17, 1922 (E. C. Van Dyke).
Washington: 1 female, Paradise Valley, Mt. Rainier, July 20, 1920 (E. C. Van Dyke).
California: 1 female, near Nellie Lake, Fresno Co., July 25, 1919 (E. P. Van Duzee).

49. **Osmia subornata** Cockerell

Utah: 1 female, Park City, July 3, 1922 (E. P. Van Duzee).

50. **Osmia mandibularis** Cresson

Utah: 1 female, Vivian Park, July 7, 1922 (E. P. Van Duzee).

51. **Osmia viridimicans** Cockerell

Oregon: 1 female, Wallowa Mts., Baker Co., July 5, 1922 (E. C. Van Dyke).

52. **Osmia nifoata** Cockerell

Utah: 1 male, Park City, July 2, 1922 (E. P. Van Duzee)

53. **Osmia eutrichosa** Cockerell

California: 1 male, Yosemite Valley, June 26, 1921 (E. C. Van Dyke);
1 male, Huntington Lake, July 1, 1919 (F. C. Clark).

54. **Osmia aprilina** Cockerell

California: 1 male, Mokelumne Hill, May (F. E. Blaisdell);
1 male, Yosemite Valley, June 10, 1921 (E. C. Van Dyke).

55. **Osmia clarescens** Cockerell

California: 1 male, Santa Cruz Isd., May 17, 1919 (E. P. Van Duzee).

56. **Osmia coloradensis** Cresson

California: 2 females, Fallen Leaf Lake, June 29, and July 19, 1915 (E. C. Van Dyke);
1 female, Sisson, July 25, 1918 (E. P. Van Duzee);
1 female, Yosemite Valley, July 7, 1921 (E. C. Van Dyke).
Oregon: 1 female, Warner Mts., Lake Co., June 19, 1922 (E. C. Van Dyke).
Utah: 8 females, American Fork Cañon, July 25, 1922 (E. P. Van Duzee);
5 females, Park City, July 2, 1922 (E. P. Van Duzee);
1 female, Vivian Park, July 7, 1922 (E. P. Van Duzee).

57. **Osmia wilmattæ** Cockerell

California: 5 females, Huntington Lake, Fresno Co., July 4-21, 1919 (E. P. Van Duzee, Mrs. E. P. Van Duzee, F. E. Blaisdell, and F. C. Clark);
1 female, Paradise Valley, Fresno Co., July 15, 1910 (E. C. Van Dyke);
1 female, Kings River Cañon, Fresno Co., July 6, 1910 (E. C. Van Dyke);
1 female, Yosemite Valley, June 9, 1921 (E. C. Van Dyke);
2 females, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee);
1 female, Mokelumne Hill (F. E. Blaisdell);
1 female, Soboba Springs, Riverside Co., June 1, 1917 (E. P. Van Duzee).
1 female, Huntington Lake, July 7, 1919 (E. P. Van Duzee).
Utah: 8 females, Park City, July 2-3, 1922 (E. P. Van Duzee);
4 females, Vivian Park, July 7, 1922 (E. P. Van Duzee);
1 female, Logan, July 15, 1922 (E. P. Van Duzee);
2 females, Salt Lake City, July 1, 1922 (E. P. Van Duzee).

58. **Osmia fulgida** Cresson

California: 1 female, Yosemite Valley, July 7, 1921 (E. C. Van Dyke).
Utah: 1 female, Park City, July 3, 1922 (E. P. Van Duzee);
1 female Parley Cañon, Salt Lake City, June 24, 1922 (E. P. Van Duzee);
2 females, Logan, July 15, 1922 (E. P. Van Duzee);
1 female, Mt. Timpanogos, July 8, 1922 (E. P. Van Duzee).

59. **Osmia texana** Cresson

California: 1 male, Bryson, Monterey Co., May 19, 1920 (E. P. Van Duzee);
1 male, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee).

60. **Osmia seneciophila** Cockerell

California: 2 males, Fallen Leaf Lake, June 20 and July 14, 1915 (E. C. Van Dyke);
1 male, Huntington Lake, Fresno Co., July 5, 1919 (F. C. Clark).
Oregon: 2 males, Steen Mts., Harney Co., June 24, 1922 (E. C. Van Dyke);
1 male, Warner Mts., Lake Co., June 19, 1922 (E. C. Van Dyke).

61. **Osmia melanopleura** Cockerell

California: 9 females, Huntington Lake, Fresno Co., July 4-8, 1919 (E. P. Van Duzee and F. C. Clark).

62. **Osmia kenoyeri** Cockerell

California: 1 female, San Francisco, May 5, 1912 (J. C. Thompson);
1 female, Kings River Cañon, Fresno Co., July 8, 1910 (E. C. Van Dyke).
Washington: 1 female, Paradise Valley, Mt. Rainier, July 17, 1920 (E. C. Van Dyke).

63. **Osmia putata** Cockerell

California: 1 female, Huntington Lake, Fresno Co., July 8, 1919 (E. P. Van Duzee);
1 female, San Francisco, May 27, 1911 (J. A. Kusche).

64. **Osmia basilissa** Cockerell

California: 20 females, Bear Valley, San Bernardino Mts., August, 1913 (F. C. Clark);
1 female, Keen Camp, Riverside Co., June 6-12, 1917 (E. P. Van Duzee);
1 female, S. Sonoma Co., June 19, 1910 (J. A. Kusche);
2 females, Fallen Leaf Lake, July 23-4, 1915 (E. C. Van Dyke);
1 female, Huntington Lake, Fresno Co., July 16, 1919 (F. C. Clark);
4 females, S. Fork, Kings River, July 8, 1910 (E. C. Van Dyke).